Micro X-Ray Absorption Spectroscopy for Environmental Science at Beamline 10.3.2

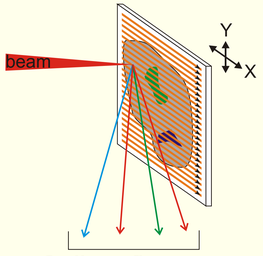
Generic Procedure

1. X-RayFluorescence Mapping (XRF)

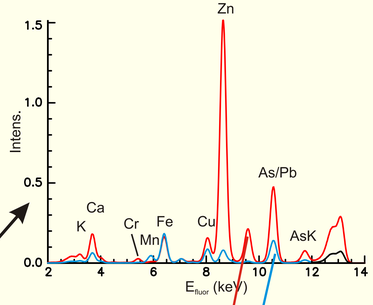
Raster the X-ray beam over the sample.

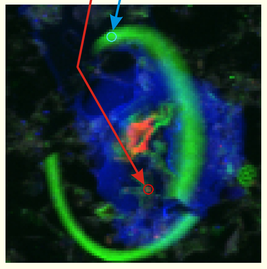
Map intensity of X-ray fluorescence from different elements to locate interesting areas.

Scan sample under beam, record X-ray fluorescence as function of position.



Collect fluorescence from probed spot with solid-state detector

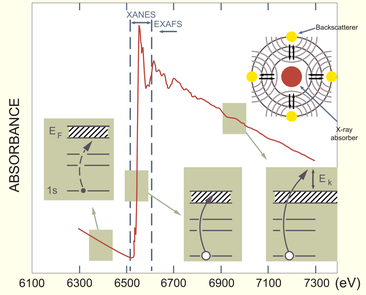




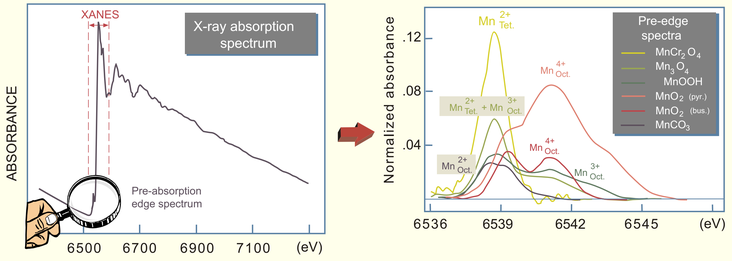
Tricolor map - Zn, Cu, Cr

2. X-Ray Absorption Spectroscopy (XAS)

Pick a spot and look at it with EXAFS, XANES



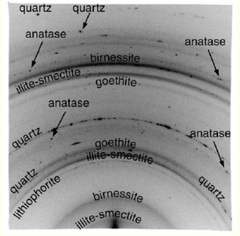
XANES spectroscopy



Yields:
Interatomic distances
Number and type of near neighbors
Chemical state

3. New capability: XRD

Identify mineral with which metal is associated by detecting X-rays diffracted from matrix.



Results:
Metal location and association.
Identities of dominant minerals.
Identity of sorbent minerals.
Chemical state of metal.